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THE RELATIONSHIP BETWEEN GDP AND TAX REVENUES FROM THE MARKET OF GAMBLING AND LOTTERIES IN LITHUANIA

More than two decades after the legalisation of gambling and almost three decades after the beginning of the organisation of lotteries in Lithuania (the Gaming Law of the Republic of Lithuania came into force in 2001 and the Law on Lotteries in 2004), it is already possible to discern the trends in the development of this business and the impact of this business on the individual and on society. Gambling and lotteries are seen ambiguously both in the work of researchers and in society: some see the activity as a fun pastime or a form of leisure, while others argue that it is an addiction with negative psychological, social and economic consequences for the individual, the family and society. In Lithuania, there has been very little research on the impact of gambling and lotteries on individuals and society, compared to other countries such as Italy, the United States, Australia, New Zealand and Canada. In these countries, gambling and lotteries have a very long and deep tradition, are a very important area of the economy (business) and a popular way of spending leisure time. This article examines the development trends of the gambling and lotteries market in Lithuania. The study made use of quarterly time series data including from 2004Q1 to 2021Q4. During the research we established, that every year, the income from land-based gambling decreases and the gross income from online gambling increases. In 2021, 53 percent of the gross gambling and lottery revenue structure was from online gambling. Additionally, according to the of Autoregressive Distributed Lag (ARDL) model, the paper estimated the relationship between the gross domestic product of Lithuania and the tax receipts of gambling and lotteries to the Lithuanian state budget. According to the study, GDP growth influences gambling and lottery tax revenues directly, without postponed effect, but at the same time, there is a fairly strong inertia in budget revenues from gambling and lottery.

Keywords: *gambling and lottery tax revenue; gross gambling revenue; gross domestic product; Lithuania.*

INTRODUCTION. Gambling and lotteries are businesses which, like other similar businesses such as alcoholic beverages and tobacco (of the so-called "sin" industries, namely cigarettes and gambling "sin" industries), are subject to strict governmental control and regulation to appropriately balance and protect the interests of both the sellers of the goods and services and the buyers of the goods. The services provided by gambling and lotteries as a specific business evoke an ambiguous attitude in society: some identify the services offered by this business as a popular and widespread type of entertainment in the world, while others highlight the inherent risk factor in these services, which may cause participants in gambling and lotteries psychological, social or financial difficulties. Gambling and lotteries in the Lithuanian economy account on average for only 0.3 percent of gross domestic product (GDP), while tax revenues account on average for 0.03 percent of GDP and 0.17 percent of gross tax revenues in the national budget. However, according to public opinion poll conducted by Vilmoris in October 2020, about 12 percent of citizens aged 18 and over were gambling, and on average one gaming resident spent about EUR 363.9 per year or EUR 30.3 per month [1]. It is estimated that the annual expenditure of one household member on gambling and lotteries accounted for about 23 percent of the total expenditure on recreation and culture. Digitisation, growing hardware and software innovations, and the COVID-19 pandemic have led to the growth of the online gambling market. Following the legalisation of online gambling in Lithuania in 2016, the gross gambling income of this type of operator amounted to EUR 15 460 941, i. e. only 12 percent of the total gross gambling and lottery income, and in 2021 – already 53 percent of the total gross gambling and lottery income, i. e. EUR 102 166 807. In the 2016-2021 period, the

gross income of online gambling increased by 46.53 percent on average each year, while the biggest jump in the gross income of online gambling occurred in 2021 – the gross income of this type of gambling increased by 71.53 per cent. In 2021, the gross income of the Lithuanian gambling and lottery market increased significantly – gross gambling income increased by 28.73 percent compared to 2020, i. e. gambling and lottery operators received EUR 43.2 million higher gross income in 2021. In 2021, the gross income of the Lithuanian gambling and lottery market increased significantly – gross gambling income increased by 28.73 percent compared to 2020, i. e. gambling and lottery operators received EUR 43.2 million higher gross income in 2021. As the gross income of gambling and lotteries increases, so does the share (significance) of this sector of the economy in the GDP of the country. In 2004, the gross gambling income of gambling and lotteries amounted to 0.22 percent of GDP, while in 2021 the GGR was already 0.35 percent of GDP [2;3]. Similar trends of increasing gross gaming revenue from gambling and lotteries are observed globally.

The main goal of this study is to develop the ARDL model to estimate the relationship between the gross domestic product of Lithuania and gambling and lottery tax revenues to the Lithuanian state budget. The study considered a period starting from 2004 to 2021. This is because it is within this period that some of the data needed for the study are available. The key interest of this study is to look at the impact of these selected macroeconomic variables: GDP and gambling and lottery tax revenue. The study will discuss the effect of GDP having a positive or negative impact on gambling and lottery tax revenue. The sources of these data on the Lithuanian gambling and lottery market are collected from the website of the Gaming

Supervisory Authority under the Ministry of Finance of the Republic of Lithuania, and the work analyses legal acts, statistical data, and scientific articles.

LITERATURE REVIEW. Over the last few years, the number of gambling and lottery research has also increased as a result of increased opportunities to gamble and participate in various lotteries. The topic of gambling and lotteries is dealt with comprehensively, broadly, and in several directions. Some researchers analyse gambling and lotteries by combining different disciplines and approaches. This research is a symbiosis of economics, law, psychology, medicine, sociology and political science; these studies are characterised by multidisciplinary [4]. As Akcayir et al. [5] observe, there is very little research of this kind. In the vast majority of scientific studies, researchers confine themselves to a narrower approach to gambling and lotteries. Their research mainly deals with the subject of gambling and lotteries from one point of view, from the aspect of only one scientific field and the scientific work of that field. Akcayir et al. [5], using co-citation analysis as a bibliometrics method, analysed 2418 research papers on gambling published in peer-reviewed publications in 2014–2018 and found that in accordance with the number of citations, about 43 percent of research authors cited articles related to neurological science, 24 percent of research authors cited articles in psychological science, and 23 percent cited articles in psychological science; health sciences, 8 percent in psychiatric sciences, and only 2 percent of studies cite scientific articles in the social sciences and humanities.

Buchanan & Shen [6] after analysing 265 articles, distinguish four topics that are of most interest to scientists: 1) a portrait of the person involved in gambling (age, gender, income, etc.); 2) the needs of the person participating in gambling and motivation to gamble and participate in lotteries (to choose this service); 3) gambling and lottery market; 4) impact of gambling on society.

Gamblers can be grouped by their motives and level of involvement in gambling. The first group is social gamblers, in other words, "emotional" gamblers, for whom gambling is a form of leisure time during which people experience excitement, feelings of gambling, overcome boredom, and relax. Social gamblers are generally not harmed by gambling, and the hobby does not interfere with their lives [7]. The second group is the professional, i. e. financial, gamblers, for whom gambling is an occupation where the aim is to win, and where the gambler believes that a financial win can improve the financial situation; such a person is distinguished from problem or pathological gamblers by better impulse management, psychological stability and better stress management skills, allowing them not to make mistakes in the thinking of typical gamblers and not to take unnecessary risks [8]. The third group is problem gamblers. Persons who experience one or more forms of gambling. They often visit gambling venues and spend money that should normally be used for other purposes. The negative consequences are borne by them, their family members, their workplace or their community. This is usually a negative impact that threatens individuals, and their families or professional interests [9]. The fourth group, pathological gamblers, are gamblers who persist in engaging in harmful activities, despite the negative consequences they cause. Compulsive gambling is a mental disorder characterised by recurrent episodes of compulsive gambling that overwhelm a person's life to such an extent that he or she abandons social, occupational, material and family values and commitments [10].

Per Binde [11] presents a motivational model of gambling participation, which includes five motives that determine people's choice to gambling. The reasoning is as follows: the dream of winning the jackpot and changing one's life and the lives of their loved ones, social rewards, intellectual challenge, the swings created by the game, and the underlying motive for all gambling – simply the chance to win. Sundqvist et al. [12], describe differences in gambling motives between different subgroups of lifetime risk-takers, stratified by age, gender, alcohol and drug use patterns and the type of game used to select the level of gambling risk.

Williams et al. [13] systematically 492 studies, and observed that about 80 percent of all research aimed at analysing the social and economic impact of gambling is conducted in the US and Canada, and 12 percent in Australia and New Zealand. The impact of gambling and lotteries can be analysed and evaluated from a narrower and broader perspective. More narrowly, the impact of gambling and lotteries is the impact on the individual and their loved ones: the prevalence of problem gambling and its psychological, social and economic consequences. From a broader perspective, the impact of gambling and lotteries on society (the state): gambling and crime, gambling and government tax revenues and government expenditure, employment levels in the gambling and lottery markets, etc. Different theoretical and methodological approaches to analysing the positive and/or negative social, economic, psychological, etc. aspects of the impact of gambling and lotteries [4; 13–17].

The topics most frequently analysed by scientists in the economy of gambling and lotteries are the types of gambling and lotteries, their prevalence and trends [18]; demand for and supply of gambling and lotteries; calculations and estimates of demand, revenue and cross-elasticity for gambling and lotteries [19–24]; gambling, lotteries and their taxation [25–28]; different types of gambling and lotteries tax rates, tax base and tax revenues to the national budget [19; 29; 30]. The tax treatment of gambling and lotteries, tax rates, the tax base and other issues related to the taxation of these activities are subjects of sharp debate among politicians and entrepreneurs.

It should be understood that the activity of gambling affects state revenues not only directly. The indirect impact of gambling is additionally analyzed in different countries. In particular, the impact on people's health, their ability to work, the level of crime, which indirectly affects both the level of GDP and the level of fees to the budget, as well as government expenditures, are under consideration [31]. In 2022, another threat appeared because a significant part of the gambling operators is directly or indirectly connected with the aggressor country. This leads not only to the withdrawal of funds to the Russian Federation but also to the possibility of carrying out certain illegal activities in some countries. In Ukraine, in 2022, the activity of pro-Russian operators was banned, which significantly affected the revenues of the state and local budgets.

RESULTS.

Gambling and lotto in lithuanian: data and development of the market. The beginning of the regulation of gambling in Lithuania can be considered the year 1992, when the Government decided to establish the Gambling Commission under the Ministry of Finance, which was assigned the exclusive right to control the organization of gambling (place, time, types of gambling). But only in 2001 the Gambling Law and the Gambling Licensing Rules were adopted in Lithuania, and the State Gaming

Supervision Commission was established, which in 2012 March 1 was transformed into the Gaming Supervision Service, which supervises and controls the gambling, lottery, and game markets. In 2003 the Law on Lotteries was adopted and the rules for licensing of large and small lotteries were approved.

Changes in the Lithuanian gambling and lottery market have been accompanied by its continuous development. The first license to organize gambling was issued in 2001. October 19; in 2002 February 8 the first permit to open a slot machine salon was issued; February 22, 2002 the first permission to open a gambling house was issued, and at the end of 2002, 28 gambling tables, 169 category A slot machines and 55 category B slot machines were already operating in places where gambling was organized. During the period 2002–2022, the Gaming Supervision Service issued 60 licenses to organize gambling: 16 licenses to organize table games and gambling with category A slot machines, 18 licenses to organize gambling with category B slot machines, 2 licenses to organize bingo, 5 licenses to organize totalisator and 19 licenses to organize betting. March 2022 In Lithuania, 3 companies had licenses to organize gambling in gambling houses, 9 companies in slot machine salons, 7 companies for betting, and 2 companies for totalisators. Although 2 companies received a license to organize bingo during the mentioned period, there are currently no companies operating this type of gambling in Lithuania

Since 2016 after the amendments to the Gaming Law of the Republic of Lithuania came into effect, remote gambling is organized in Lithuania – 8 companies have permits to provide these services [3]. An important change has taken place since 2019. December 31 after the amendments to the Law came into effect, when new opportunities opened up for gambling organizers – they gained the right to organize several types of gambling in the same gambling premises. In the beginning of 2022, there were a total of 53 places where the same gambling operator operates several types of gambling. Legalized remote gambling has not only fundamentally changed the gambling market, but has also led to new challenges.

In 2004, the first Law on Lotteries in Lithuania was adopted [32], and the State Gaming Supervision Commission began supervising the organization of large lotteries, and the first license in Lithuania was issued on 13 February 2004 from 2004 to 2022, a total of 16 companies received a license to organize big lotteries. In 2022 at the beginning, 6 companies had licenses to organize lotteries. On 2020 May 1st the new Law on Lotteries of the Republic of Lithuania entered into force, which regulated online lotteries, established requirements for the age of players and the withdrawal of winnings, and other changes.

According to the legislation of the Republic of Lithuania, lotteries are not considered a type of gambling. It is important to note that in Lithuania, unlike the majority of European or world countries, gambling (table games – roulette and card or dice, A and B category slot machines, betting, totalisator, bingo, remote games) and lotteries are considered separate types of entertainment, therefore the legal regulation of these activities in Lithuania differs [33]. Depending on the way gambling is organized, land-based and remote gambling can be distinguished, but in Lithuania, according to the presented classification of gambling, remote gambling in Lithuania is considered a separate type of gambling. There are some other differences – bingo and

totalisator are not considered separate types of gambling in all countries (unlike in Lithuania): bingo can be classified as a subspecies of lotteries, and totalisator as a subspecies of betting. During the research, these differences created the problem of comparing gambling and lotteries in Lithuania with gambling and lotteries in other countries. In Lithuania, two types of income can be distinguished in the activity indicators of companies organizing table games, games with category A slot machines, games with category B slot machines and betting: income from the sale of chips, tickets, cards, i.e. amount paid for participation in gambling (Gross expenditure of gambling) and general gambling income, i.e. result from gambling activities (Gross gambling revenue). A total of 34 million euros in gross gambling income was generated in 2021 for gambling in land-based locations. This is 22.55 percent less than in 2020, but the impact of COVID-19 should be assessed, as some of the time these institutions were unable to operate. In the pre-pandemic years, e. g. in 2015, this income was as high as EUR 85.86 million. In 2021, Lithuanian residents who participated in these games paid EUR 218.504 million, where of EUR 184.467 million were withdrawn as winnings. In the pre-pandemic years, e. g. in 2015, Lithuanian residents who participated in these games paid 709.971 million euro, whereof 624.112 million euros were withdrawn as winnings.

In 2016, following the entry into force of amendments to the Gaming Law of the Republic of Lithuania, online gambling was started to be organised. In 2005, the structure of gross gaming and lottery revenue was dominated by revenue from land-based gambling, which accounted for 73 percent of the total (lotteries accounted for 27 percent of GGR), while the introduction of online gambling has led to significant changes in the structure of gross revenue. Every year, the income from land-based gambling decreases and the gross income from online gambling increases. In 2021, 53 percent of the gross gambling and lottery revenue structure was from online gambling, 17 percent from land-based gambling and 17 percent from lotteries – from land-based gambling and 30 percent – from lotteries. In 2021, the organisers of major lotteries distributed more than 117.4 million lottery tickets in Lithuania, and the turnover of tickets amounted to more than EUR 129.112 million. Just like gambling, lotteries also pay out money to winners, so in 2021 the organisers of the big lotteries received 57.4 million euros in revenue (GGR) from lottery activities. The largest annual gross income growth of lottery operators was 27 percent in 2011, 25 percent in 2012, 29 percent in 2015 and 22 percent in 2021. The gross income of lottery and gambling operators in 2021 amounted to more than EUR 193.612 million, while players spent more than EUR 1.987 billion, i. e. 40 percent more than in 2020 (EUR 1.418 billion).

Taxes play an important role in all modern societies as the most important internal source of financing for public services and goods. Taxation of gambling and lottery operators is quite different in the countries of the world, but in most countries, the tax base for gambling is the Gross Gaming Income (GGR), for lotteries – the nominal value of lottery tickets distributed, and the taxation is set either as a percentage of the tax base, or as a fixed tax on gambling devices per year/month, or there may be a mixed method of taxation, i.e. it is set both as a percentage of the tax base and as a fixed tax on gambling devices per year/month. In Lithuania, lotteries and gambling companies are taxed on their income, subject to all taxes applicable to businesses.

Until 1 July 2022, the gambling tax was calculated on the gross gambling income (GGR), in other words, on the amount fewer winnings and a fixed fee was paid for gaming devices per month, while in lotteries this tax was calculated on the number of tickets distributed before the winnings were paid out (Table 1). From 1 July 2022, changes to the taxation of gambling and lotteries in Lithuania will take effect. From 1 July 2022, the tax base for lotteries shall be the face value of the lottery tickets distributed, and in the case of gaming with slot machines, table games, bingo, totalisator, betting and online gambling, the amount obtained from the amounts wagered by the players, less the number of winnings actually paid to the players. Tax rates have also changed: for the organisation of lotteries, the tax base for lotteries and gambling is subject to a 13 percent tax rate from 1 July 2022, and will be subject to an 18 percent tax rate from 1 January 2023. From 1 July 2022, when

organizing bingo, totalizator, betting, online gambling, slot machine gaming and table gaming, the tax base is subject to a tax rate of 20 percent and no longer has a fixed tax rate for each gaming device specified in the gaming permit. Legal persons seeking to obtain a license to operate games of chance following the procedure laid down in the Gaming Law shall be subject to a one-off tax from 1 July 2022: EUR 300 000 for the issue of a licence for the organisation of table games and category A slot machines; EUR 300 000 for the issue of a licence to organise category B gambling machines; EUR 100 000 for the issue of a bingo licence; EUR 100 000 for the issue of a licence for the organisation of totalizators, including horse totalizators; EUR 100 000 for the issue of a betting licence; EUR 500 000 for the issue of a licence to organise online gambling; EUR 1 000 000 for issuing a licence to organise all types of gambling.

Table 1. Taxation of gambling and lotteries in Lithuania, Latvia and Estonia

Gambling Games and Lottery		Tax Base	Tax Rates
Lotteries	Lithuania	Face value of lottery tickets distributed	5 percent (2001 to 1 July 2022) 3 percent (2022-02-01 – 2023-01-01) 18 percent (from 2023-01-01)
	Latvia	Face value of lottery tickets distributed	10 per cent
	Estonia	Face value of lottery tickets distributed	18 per cent
Table games	Lithuania	Fixed rate per device	EUR 2,300 per unit per month. (until 1 July 2022)
	Latvia	Fixed rate per device	EUR 2340 per unit per month.
	Estonia	Fixed rate per device	EUR 1278.23 per unit per month.
Gambling on A and B slot machines	Lithuania	Fixed rate per device	Category A – EUR 260 per unit per month. (until 1 July 2022) and category B – EUR 130 per unit per month. (until 1 July 2022)
	Latvia	Fixed rate per device	EUR 431 per unit per month.
	Estonia	Fixed amount per device and per GGR	EUR 300 per unit per month plus 10 percent of the cost of the unit.
Betting	Lithuania	GGR	18 percent (until 1 July 2022)
	Latvia	GGR	15 per cent
	Estonia	GGR	5 per cent
Online gambling	Lithuania	GGR	13 percent (until 1 July 2022)
	Latvia	GGR	10 per cent
	Estonia	GGR	5 per cent

Source: compiled by the authors [34–36].

Table 1 shows the taxation of gambling and lotteries in Lithuania, Latvia and Estonia until 1 July 2022. In all three countries, the principles of taxation of both gambling and lotteries are similar. For example, the tax base for lotteries in all neighbouring countries is the face value of the lottery tickets distributed, only the tax rate differs: it was the lowest in Lithuania until 2022, at only 5 percent, while in Latvia it was 10 percent and in Estonia it was as high as 18 per cent. However, as of 1 February 2022. In Lithuania, the rate was increased to 13 per cent, and the 18 percent lottery tax rate will enter into force in 2023. Comparing the taxation of gambling in three countries until 2022, the tax base is also the same: when organising table games and games with type A and B machines, the tax base is a fixed amount per gaming device, only the tax amount per device is different.

Table gambling fees for the device are similar in Lithuania and Latvia, in Estonia – almost twice lower; Latvia has the highest tax on A and B slot machines – as much as EUR 431, while Lithuania has the highest tax on A and B slot machines – EUR 260 and EUR 130 per machine, respectively, and Estonia has the highest tax on both types of machines – EUR 300. In addition, Estonia imposes a 10 percent tax on the amount of money wagered by players minus the number of winnings actually paid out to players for both types of machines. Betting and online gambling in all three countries are also subject to the tax on the amount received from the amounts wagered by the players, less the amount of winnings actually paid to the players only in this case, in contrast to lotteries, the tax rate is the highest in Lithuania and the lowest in Estonia (Fig. 1, 2).

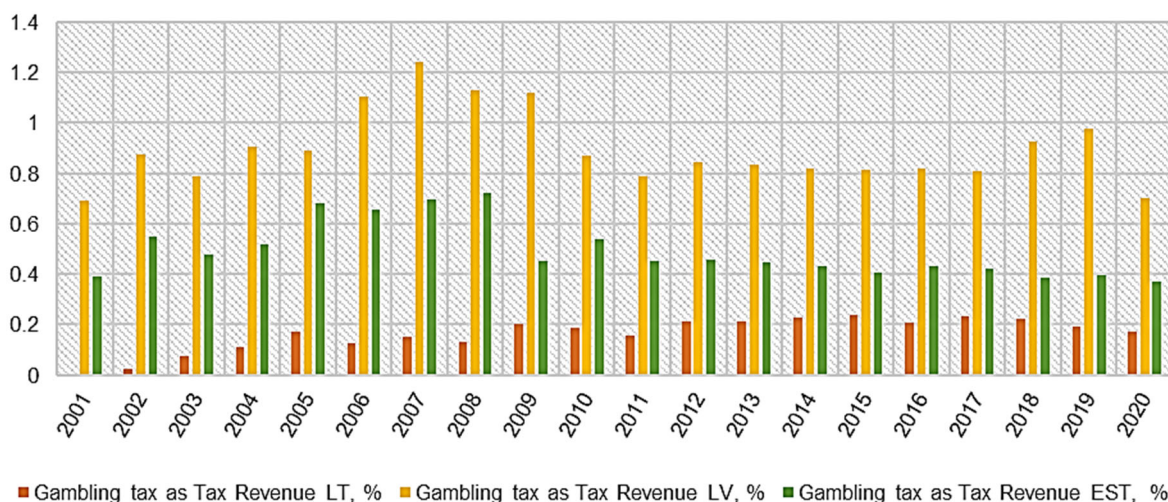


Fig. 1. Taxes paid by lotteries and gambling companies in Lithuania, Latvia and Estonia as a percentage of the total tax revenue of the state budget in 2001–2020, %

Source: compiled by the authors [2].

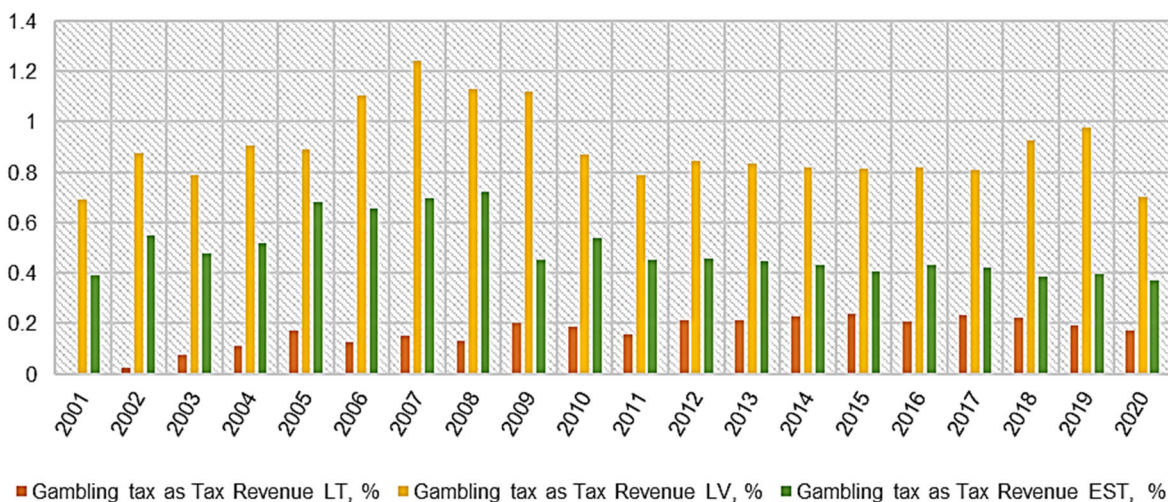


Fig. 2. Taxes paid by Lithuanian, Latvian and Estonian lottery and gambling companies as a percentage of GDP 2001–2020, %

Source: compiled by the authors [2].

Fig. 1 shows the share of taxes paid by the three Baltic States – Lithuania, Latvia and Estonia – in the total tax revenues of the state budget (as a percentage of the total tax revenues of the state budget) in 2001–2020. In Latvia, the tax revenues of the entities organising gambling and lotteries were the highest in the tax revenues of the state budget compared to the analysed period of Lithuania and Estonia. In Latvia, the highest share was in 2007, amounting to around 1.24 percent of the total tax revenue of the state budget. Estonia had lower tax revenue from this type of tax than Latvia, with the highest tax revenue for the state budget coming in 2008, amounting to around 0.72 percent of total tax revenue. Meanwhile, the share of taxes paid on gambling and lotteries as a share of total state budget revenue in Lithuania between 2001 and 2020 was the lowest compared to Latvia and Estonia. The largest amount of this type of tax was paid in Lithuania in 2015, but it amounted to

only around 0.24 percent of the total tax revenue. Thus, based on the maximum values of gambling and lottery tax revenues to the state budget in Lithuania, this tax was collected to the state budget almost 5.2 times, i. e. about 516 percent less than in Latvia and 3 times (about 300 percent) less than in Estonia. A similar trend can be seen when comparing the taxes paid by lottery and gambling companies as a share of GDP in the three countries for the period 2001–2020 (Fig. 2). As in the case discussed above (the amount of taxes on total tax revenues), the amount of taxes paid on GDP was also the highest in Latvia during almost the entire analysis period (in 2007 – almost 0.19 percent of GDP), and for six years out of the 20 years under review – in Estonia (in 2008 – also almost 0.19 percent). Examining the taxes paid in this section, the values of this indicator were similar in Latvia and Estonia during almost the whole period, only in 2018-2019. In Latvia,

this indicator increased slightly compared to Estonia. In Lithuania, the share of taxes paid by gambling and lotteries in GDP was the lowest – from 2015 to 2019, taxes paid by companies organising lotteries and gambling accounted for only about 0.04 percent of Lithuania's GDP. Comparing the indicators of all three countries in terms of the percentage of taxes paid on GDP, the gap in the amount of taxes paid in Lithuania from neighbouring countries is even wider than in terms of the amount of taxes paid from the total tax revenues of the state budget.

DATA AND APPROACH. Total tax revenue is sensitive to the changes in GDP, but each type of tax may be differently responds to the fluctuations in GDP because each type of tax has different tax bases and different tax rates. If there is no significant relationship between GDP and total

$$ARDL(p, q): Y_t = \gamma_{0i} + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{i=0}^q \delta_i X_{t-i} + \varepsilon_t \tag{1}$$

lags of the dependent variable, Y_t (i. e. $Y_{t-1}, Y_{t-2}, Y_{t-3}, \dots$); lags of the explanatory variables, X_t (i. e. $X_t, X_{t-1}, X_{t-2}, X_{t-3}, \dots$); lags of the error, ε_t (i. e. $\varepsilon_{t-1}, \varepsilon_{t-2}, \varepsilon_{t-3}, \dots$); β and δ are coefficients; γ is the constant; p, q are optimal lag orders; p is used for the dependent variable, q is used for the independent variable (regressors).

$$ARDL(p, q): \ln(GLTR_t) = \gamma_0 + \sum_{i=1}^p \beta_i \ln(GLTR_{t-i}) + \sum_{i=0}^q \delta_i \ln(GDP_{t-i}) + \varepsilon_t, \tag{2}$$

where $GLTR_t$ is **gambling and lottery tax revenues in year t** , GDP_t stands for the level of GDP and ε_t is the error term. Both variables are expressed in logarithms.

A stationarity test is necessary before carrying out the analysis because if the time series is non-stationary, the results will become spurious. **The stationarity of all-time series variables was checked by the Augmented Dickey-Fuller unit root test (ADF). GDP and GLTR are nonstationary in level, but the variables differenced one and became stationary.** Lag selection based on Akaike Information Criterion (AIC) who wed a very interesting result. The best choice signals about one lag for total revenues and 0 lags for GDP. It means that we should consider ARDL (1,0,0) model, so we should reject our hypothesis about

tax revenues, fiscal policy can be a partially effective macroeconomic policy. The hypothesis of the study: null hypothesis (H_0): there is no significant relationship between Gross Domestic Product and Gambling and lottery tax revenues; alternative hypothesis (H_1): there is a significant relationship between Gross Domestic Product and Gambling and lottery tax revenues. The study made use of quarters time series data including from 2004Q1 to 2021Q4.

Databases used include the Gaming Control Authority under the Ministry of Finance of the Republic of Lithuania, the Official Statistics Portal of Lithuania, the State Tax Inspection of Lithuania.

In our study, the empirical estimation is based on Autoregressive Distributed Lag (ARDL (p, q)) Model [37] (1):

EMPIRICAL RESULTS AND DISCUSSIONS. The beginning of our research is an autoregressive distributed lag model, which allows for a flexible dynamic relationship between gambling and lottery tax revenues and GDP:

influence of GDP in lags to tax revenues from gambling. At the same time, GDP influence gambling and lottery tax revenues directly. The adding of dummy variable also showed insignificant results. These both facts play a crucial role in understanding the situation in gambling market. It attracts people of one type, who play all the time and can't drop their habit. Approximately, one third of revenues is defined by former incomes. Also, it is worth mentioning adding season variable. It's significant only for the first quarter of the year, but it increases logarithm of revenues on 0.23 or total revenues on 1,27 million EUR. Table 2 shows the selected ARDL model is ARDL (1, 0, 0). The best model estimation results are presented as follows:

Table 2. Model ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG_GLTR(-1)	0.324482	0.097061	3.343064	0.0013
LOG_GDP	1.029935	0.173507	5.935980	0.0000
@SEAS(1)	0.227661	0.059625	3.818200	0.0003
C	-8.685187	1.490419	-5.827347	0.0000

R-squared=0.870773, Adjusted R-squared=0.865313, F-statistic=159.4739, Prob(F-statistic)=0.0000

Diagnostic tests and stability tests are performed to avoid errors in interpretation and conclusions. Table 3 gives Breusch-Godfrey Serial Correlation LM Test result. Here the null hypothesis is residuals are not serially correlated. If we

look at probability values, the values are much greater than 0.05. So, we will have to accept the null hypothesis; that means the equation is free from serial correlation.

Table 3. Results of Serial correlation LM test

F-statistic	1.392070	Prob. F(2,69)	0.2555
Obs*R-squared	2.908867	Prob. Chi-Square(2)	0.2335

CUSUM Test shows the model is stable. Therefore, it can be concluded that the model is well specified and there is no problem with autocorrelation (Fig. 3).

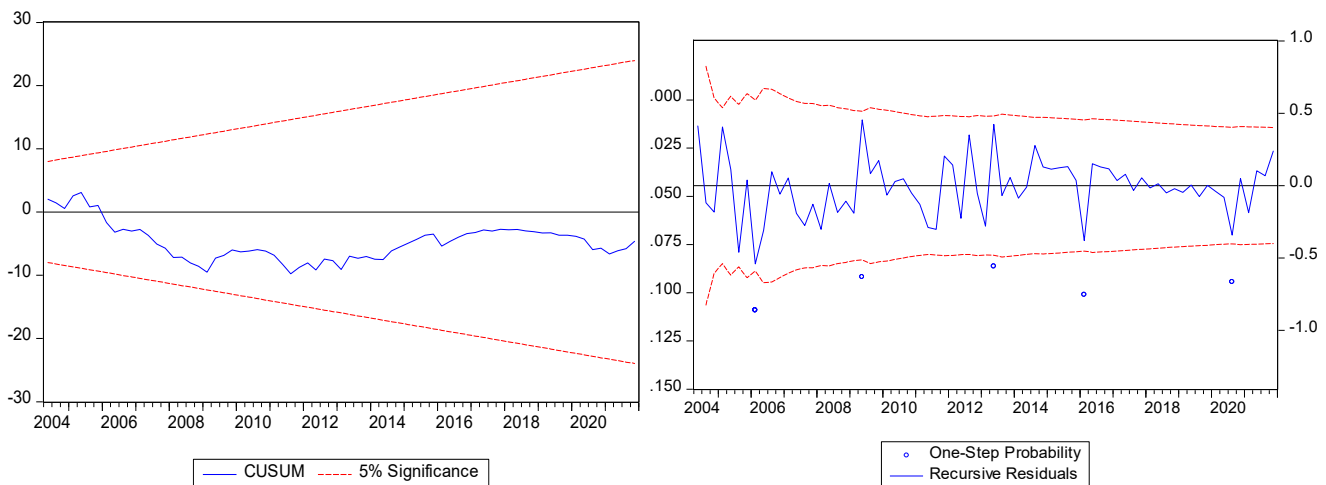


Fig. 3. Stability Diagnostics: CUSUM Test and CUSUM one-step forecast test

CONCLUSIONS. The gambling industry has been developing at a fairly rapid pace over the past decades. As practice has shown, people are interested in it, and therefore no bans will be of practical importance, there will always be an opportunity to bypass all restrictions for games. The development dynamics of gambling in Lithuania show that since 2004, revenues have grown more than 6 times, demonstrating consistently positive dynamics. At the same time, it is impossible to claim that this market does not change. In fact, fundamental changes are taking place in it. Although the main means of games are totalizers and slot machines since 2016 there has been a surprising replacement of offline games with online counterparts. Since then, online gambling revenue has grown from 0 % to 53 % of all revenue. This means that in a few years, virtually all gambling will be exclusively online. Obviously, it creates new challenges for the analysis and monitoring of this area.

A study was carried out, on whether there is an influence of GDP on income from games. An ARDL model was built, which showed that, in general, such an effect is indeed observed. According to the model, GDP growth influences gambling tax revenues directly, without postponed effect. This means that the increase in people's incomes really incentivizes people to play. At the same time, there is a fairly strong inertia in budget revenues from games. In particular, the income of the current period is 32 % determined by the level of income of the previous period. This means that almost a third of all players play exclusively regularly.

The share of GDP produced in the gaming sector will grow, and the turnover of gaming market operators will also tend to grow. At the same time, it should be noted that these turnovers will primarily take place in a remote format, that is, it will be very difficult to track them. On the one hand, this will contribute to the unification of market operators, and the creation of powerful corporations that will work in several countries, which means that they will have significant stability. On the other hand, it will significantly increase the risks for illegal operations, including financing of individual organizations in the country at the request of other states. Therefore, from the point of view of state policy, steps should be taken to strengthen supervision over the activities of gambling operators.

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ВЗАЄМОЗВ'ЯЗОК ВВП ТА ПОДАТКОВИХ НАДХОДЖЕНЬ ВІД РИНКУ АЗАРТНИХ ІГОР ТА ЛОТЕРЕЙ У ЛИТВІ

Понад два десятиліття після легалізації азартних ігор і майже три десятиліття після початку організації лотерей у Литві (Закон Литовської Республіки про азартні ігри набув чинності в 2001 р., а Закон про лотереї в 2004 р.) уже можливо розпізнати тенденції розвитку цього бізнесу та його вплив на людину та суспільство. Азартні ігри та лотереї неоднозначно сприймаються як у роботі дослідників, так і в суспільстві: одні сприймають цю діяльність як веселе проведення часу або форму дозвілля, а інші стверджують, що це залежність з негативними психологічними, соціальними та економічними наслідками для особистості, сім'ї і суспільства. У Литві проведено дуже мало досліджень щодо впливу азартних ігор і лотерей на людей і суспільство порівняно з іншими країнами, такими як Італія, Сполучені Штати, Австралія, Нова Зеландія та Канада. У цих країнах азартні ігри та лотереї мають дуже давні та глибокі традиції, є дуже важливою сферою економіки (бізнесу) та популярним способом проведення дозвілля. Розглянуто тенденції розвитку ринку азартних ігор та лотерей у Литві. У дослідженні використано квартальні часові ряди даних, включаючи період з 1-го кварталу 2004 р. по 4-й квартал 2021 р. Встановлено, що з кожним роком дохід від азартних ігор на автоматах зменшується, а валовий дохід від азартних ігор онлайн зростає. У 2021 р. 53 % валових доходів від азартних ігор і лотерей становили азартні онлайн-ігри. Згідно з ARDL-моделлю було оцінено співвідношення між ВВП Литви та податковими надходженнями від азартних ігор і лотерей до державного бюджету Литви. Досліджено, що зростання ВВП впливає на податкові надходження від азартних ігор і лотерей безпосередньо, без відкладеного ефекту, водночас існує досить сильна інерція доходів бюджету від азартних ігор і лотерей.

Ключові слова: податкові надходження від азартних ігор і лотерей, валовий дохід від азартних ігор, валовий внутрішній продукт, Литва.

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Received: 23/01/2023

1st Revision: 13/02/2023

Accepted: 28/03/2023

Author's declaration on the sources of funding of research presented in the scientific article or of the preparation of the scientific article: budget of university's scientific project.